LECTURES

ON

HOUSEHOLD ARTS.

BY

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Lecture I.

I

A little more than a hundred years ago, in America, girls were not considered capable of " taking an education. " It had been accepted that they possessed souls, but men still doubted that they had brains. At any rate, the only education vouchsafed them was the crumbs of learning which fell from their brothers' table.

When the boys were home for dinner, the vacant hour in the elementary school might be used for the instruction of the girls. " Dames Schools " offered training in " morals and manners ", with needle-work and music thrown in. Later there was started in Massachusetts a system known as the " Double-header " school; where the boys aud girls alternated the time morning and evening. Gradually provision began to be made for undertaking the education of girls.

Among the first of these efforts were the " Female Academies. ".

But it was long after this before any opportunity for collegiate work for women was available. When Vassar College was organized and opened, the whole country watched the experiment with keen interest, and the young women who formed the first entering class were subjected to close criticism by the public.

Among these was a young woman, by name Ellen Henrietta Swallow, who had saved her small earnings, had borrowed a little more and by means of tutoring was able to earn part of her expenses. Such earnest girls as these were deeply determined to prove to the world that " women had minds " and could use them.

It was but natural then that in the competition thus created the course of study should have been patterned after that of the men's colleges. The same subjects and method which men persued, preparatory to their professions as Doctors, Lawyers, Preachers, Engineers, Businessmen, were offered women as a means of preparation for the profession of home-making. The

consequence was, we soon had our " Penny papers " and " Joke Books " full of stories of how the College-girl returned to her home too proud and " learned " to have anything to do with her mother or the house work. She was pictured with severe features and manish dress, large eye-glasses, and insolent manner pouring over her books, while her mother did the house work and acted as her maid. Also, that college training unfitted a woman for marriage, was long and bitterly contended. This extreme may have existed, and doubtless many girls through a false sense of there own learning, lost touch with home life and sympathy with the home environment.

Our young and ambitious Ellen Swallow was not of this class. Deeply interested in Science, her chief attraction was to Astronomy, but she chose rather the subject which was second in favour, Chemistry, because she saw by this means a possible way of applying science to practical problems of the home.

Again came the obstacle of tradition to thwart her ambition. No chemical laboratory in the country was open to women, and for

months it seemed she would have to give up her desire. After persistent effort the Massachusetts Institute of Technology, Boston, was induced to admit her; but they would not register her as a student for fear of " establishing a precident. "

So great was the success of her work as a student that she was appointed assistant and later elected to the faculty. She was put in charge of the air and water analysis laboratories, and later rejoiced to see many women admitted to the Institute. She married Dr. Richards, head of the Geology Department and their home became the centre of hospitality for the students. Mrs. Richards continued her teaching and lecturing until her death. Ellen H. Richards to-day is revered by all, as the " Mother " of Home Economics or Household Arts. In her own home, she applied her scientific principles and wrote many books that are still standard works on the subject. She has defined the purpose of Home Economics in these words.

Home Economics stands for the ideal home life of to-day, unhampered by traditions of the past; for the utilization of all the resources

of modern science to improve home life; for the freedom of the home from the dominance of things, and their due subordination to ideals; for the simplicity in material surroundings which will free the spirit for the more important and permanent interest of the home and of society. "

Dr. Edward Devine states-that, " To maintain normal family life, to restore it when it has been interfered with, to create conditions more and more favourable to it, is the underlying object of all our social work. "

Another authority says " The family is the foundation of morality, the chief educational institution, and the source of nearly all real contentment among men. " And Peabody writes:-" One approaches, for example, the most immediate and fundamental of social problems-the institution of the family. It is the vestibule of the social order, the unit of civilization, the original group into which by the very circumstances of human birth and infancy each individual is introduced. The evolution of the family is a curious record of this struggle of types in which every possible relation has been historically tried and sifted out so that the fittest survive.

And meantime what is the conception of the family which through the long ages of its evolution has gradually emerged and which is now the only guarantee of its stability and permanence ? The family, many people may be almost surprised to learn, is not a device invented to procure either personal happiness or mutual convenience. The family is in danger when it is created for what one can get out of it, and it is only safe when it is prized for what one can give to it. The family is the chief human instrument for socializing of the will and the spiritulizing of desire. "

With this conception of the importance of the family economically, socially and scientifically considered, the early pioneers in the field of women's education undertook the tremendous task of organizing into subject matter, for the school curriculum, material which had never been used for formal instruction.

It was about forty years ago that the first course in Home Economics was established in a College of the Middle west of the United States, and the first attempt made to modify education

to suit a woman's particular problems as home makers.

Dr. Andrews reports in 1912–13, two-hundred and fiftytwo Colleges in United States offering instruction in Home Education. Five-thousand, five-hundred and forty-seven students reported in Home Education courses, though there were eight-thousand students probably in 1913 and not less than ten-thousand students in 1917. Of these students sixty-three percent were studying the subject for home use; thirty-two and one-fifth percent were preparing to teach home economics; four and four fifth percent were preparing for administration positions.

In 1895 only eleven states gave Home Economics Instruction, in 1917 it is offered in every State in the Union.

One-hundred and fifty-nine Normal Schools; twenty-four hundred and forty High-Schools; three-thousand-and eighty-two towns and cities are giving Household Arts instruction."

"The effort in each place has been much the same; for first, great indifference and public prejudice has had to be overcome; secondly, new

methods of teaching had to be devised: thirdly teachers must be trained to these methods. "

This growth of the work is due to the recognition by the Government and by the people who control education, of the thought given us so pertinently by Kipling; " The strength of the pack is the wolf and the strength of the wolf is the pack ". The family is the unit of society and if the State and the country is to be strong, if it is to be healthy, the individuals composing the families must be strong and healthy. Therefore by land grants and by legislation the Government has encouraged the education of women for household as they have men for agricultural work. In each community the work of establishing courses in Houshold Arts is left to local effort. It is then given partial State and Federal aid.

Helen Campbell says:—" In the individual, the household, the state, is organic life; and until its essential structure and function is understood, we cannot know how to maintain its health or promote its development ". " Household Economics (and Arts), is the connecting link between the physical economics of the

individual, and the social-economics of the State. Its relation to human life is of most intimate and vital nature. The life of the family, with all that it means to the life of the race, is absolutely dependent on the household life. Whether we live or die, and how we live or die, are largely determined by our household conditions. Organism stands simply for the interdependent relation of structure and function. The household is a living organism that is the keynote of its study. It is a form of human life outside the physical life, inside the social life, having its own economy. Its structural demands vary, but certain essentials always remain. The structure of the household must provide for the accommodation of the related beings who are its life, and the accommodation of the activities which maintain their lives in that relation. Also its functional demands vary, but certain essentials always remain. This structure and these functions are truly organic. The one maintains the other, function forming organ, neither existing alone. "

" The industries, which form our household functions vary widely in kind and in degree. It is difficult to approach the discussion of this

subject because it is dealing with materials and processes about which we are used to see the knowledge practised by the lowest class of people in the lowest form of labour. I want you to see this not as a new science but as an old one long misunderstood and buried under centuries of densest prejudice. We are to study these branches of social economy, which are involved in house-keeping, the sciences, arts and crafts therein practised and their effect on human life. We study human life, conceived as a whole, and the intelligent relation of life's activities to a common purpose, that of individual and social health. "

Household Arts deal with the processes of prevention rather than cure. We believe that a child has certain rightful inheritances which parents and society are in duty bound to supply. Every child has a right to be " well-born, " that is, to be born strong, perfect and well, and the home must provide a suitable environment for maintaining the health and preventing the ills that are preventable. They have a right to clean air, safe water, adequate clothing, sufficient sleep, proper exercise and play, the right diet, rest, education, physical, mental and moral.

I confess to a vast ignorance of Indian conditions and needs. But I know the world as a whole is in need of many of the same things. Your problems are not so much unlike America's problems. Your customs may differ, and tastes vary, but in the last analysis the human body requires much the same care. Economic and scientific principles do not alter with locality. Truth is not a matter of opinion, of prejudice or personal tastes.

You are confronted, as we are, with changing conditions. Formerly the needs of the family were all provided at home, gradually these home industries are being taken over by business concerns, and we now buy that which formerly we made.

What activities are to replace those taken away from the home ? What new problems present themselves ? Chief among them is the problem of " Choice. " Now we must know values in order to choose wisely, whereas formerly we knew values in order to produce.

We used to sum up the school curriculem as the " 3 R's ":- " Reading, ' Riting, ' Rith-

metic ". To these have been added the 4th R- "Right-living ' . The art of " Right-living " necessitates " conscious control of our environment, ". If we are to control conditions then indeed we must know the laws governing conditions. The problem grows more complex as processes escape from the house into industry.

I was intensely interested in the Food and Industries Exhibition in Bombay. You too are coming to the place where you must get acquainted with manufacturer's names and learn to know labels, for when you buy your food in tins, instead of in an open market, you cannot see the material and you are forced to rely upon the manufacturer whose name is known as a guarantee for good quality.

We agree with Elizabeth Jenkins. " It is a mistake to plan a course as if home-making were a trade or a profession, when it is in essence a " fine-art. " There is a distinction between trades, professions and fine arts, which will serve as a basis for the contention that really significant instruction will be given only when home-making is looked upon as a fine art. In trades we concern ourselves with what can

be successfully accomplished by skill of hand. In the professions, most delicate skill of hand may be necessary, as in the case of the surgeon, but success depends on the power of mind to make severe and sustained effort. In the fine arts skill of hand is necessary. Power of intellect no less so, but success comes only when both are driven to their work by the emotions.

Manual dexterity is not the chief concern. Capacity for clear, analytic thinking trained by knowledge of the sciences and drill in laboratory methods, is not the fundamental basis of the home. But as in every art, the need is " to bring reason and proportion into the life of the emotions ". The mother's conception of the kind of character needed in the world, is her artist's vision; and just as the artist power is a complex of manual skill, scientific knowledge, love of beauty, and the ability to see beauty in all the relations of human life, so the genius of the home-maker must be wrought of the same stuff."

This is in general the purpose of Household Arts Education. Here as elsewhere the same steps must be taken in establishing this work in the schools. Indifference and public prejudice

must be overcome, and this requires tactful publicity and slow dissimination of ideas by means of lectures or talks, exhibits and published articles, dealing with the content of the subject. It must be shown that the work has real values and is applicable to local needs. Secondly new methods of teaching must be devised appropriate to Indian life and conditions. It would be absurd to transplant courses of study and text-books from England or America; as foolish as to import equipment and teachers. Thirdly, Indian teachers must be trained to these methods, it will necessitate the organization of the subject matter of food, shelter, clothing and home-management, upon a basis of practical home problems. It means the working out of the best methods of solving those problems. It means research into social and economical conditions in their bearing upon home life, but it means also the improvement of home conditions and the conservation of health and family life.

Lecture II.

II

In this short series of talks, I shall attempt to give you a general survey of the field of Household Arts subject matter. I can only indicate the several avenues of work, hoping you will bear in mind ~~the fact~~ that the work is, in each case adjusted to the type of school, locality, age and ability, of the students, and their purpose in taking the course. Household arts is organized in the Elementary Grades as "surrounding Life," it is planned for practical "Home making" in the High Schools, it is matter for "professional study and research" in the College and University.

The war has impressed the world with the importance of food economics. Again and again, we have been told that the war would be settled on the question of food supply. In America, the Household Arts experts are actively enagaged

on the problems of food conservation. Certainly, this is a subject worthy of study of the most learned and scientific as well as of the poor and humble. Many people have studied the subject in a superficial way and seem thereby to have become " inoculated " with it, so that it becomes difficult, if not impossible, to really teach them anything.

Those who know most are most ready to admit the vastness of the subject still to be explored, while most women who have kept house feel qualified to teach Household Arts. You might as well expect one who has had a course in " First Aid " to practise medicine, or one who " plays by ear, " to teach music.

The scientific study of foods necessitates a thorough ground-work in pure science. Inorganic, Organic, Quantitative, Qualitative, Analytic, Bio-Chemistry and Physiological Chemistry all throw light upon the subject. Botany, Zoology, Physiology, and Physics all contribute their share in the preparation of the student to undertake the study of foods. But the other approaches to the subject must not be neglected and Science is held in its proportionate importance to the

Economic and Sociological aspects. The College students acquaint themselves with the food industries, the process and costs of food stuffs. They experiment in the methods of applying heat in the cookery of foods. Marketing, buying and the planning of the menu must be considered. Their real work in nutrition is begun in the senior year with the study of dietetics.

To-day I shall sketch briefly the earlier aspects of the food subject, leaving the discussion of dietaries until our next meeting. A usual figure of speech employed in explaining the simple facts of nutrition is that the body is a working machine similar to a motor-car or automobile. That simile definitely expresses the meaning I wish to convey, for the energy with which the body moves is generated within itself as it is in the automobile. The main difference is that the body never stops running and is therefore, more like an automatic clock. The heart must continue its work without ceasing. The energy required by the heart to continue its beating for one day would be sufficient to lift an average man twenty-five hundred feet in the air. We know the body has much more to

do than merely keep its heart beating. All of this energy must be generated within the machine from fuel or food which is eaten, just as the energy for running the motor-car must be generated within itself from the petrol. The motor will stop if the petrol is exhausted, but our life will not stop until it has exhausted all available food and tissue which may be used for fuel. If the petrol is of a bad quality the machinery becomes clogged and out of repair; if the body has improper food, it also gets into a condition of dis-repair. The motor-car cannot be repaired with petrol, neither can the body be repaired with the same foods which furnish only energy. It must have body building food to reconstruct tissue. Food is defined as " that which, taken into the body, builds tissue or yields energy. "

The fuel for the human machine originally comes from the Sun which sheds its rays of light and heat upon the plant. Vegetable life has the power to synthesize the light, heat, air, water and mineral from the soil into other substances. It is a chemical process. " The chlorophyll cells or the leaves of green plants utilize

the energy of the Sun's rays to bring about reactions between carbon-di-oxide and water with the liberation of oxygen and formation of organic compounds." The process can actually be watched in some plants by means of a microscope. They have power to build up carbo-hydrates, fats, and, with the nitrogen and mineral matter of the soil, construct protein. These three classes of food substances, proteins, fats, carbo-hydrates, may all be utilized by the body for the energy. In the vegetable we recognize the carbo-hydrates in the sugary juices of plants such as sugar-cane and beets, and starch in grains of corns, starchy vegetables and some nuts.

Fats or oils are found in olives, grains, nuts, cotton-seed, cocoa, bean and other seeds. Protein is especially found in the legumes, including Tuver, Val, Gram, Mug and Chola, also in such nuts, as almonds.

When animals eat these various plant foods they are converted into carbo-hydrates, fats and proteins in the animal body. Many people secure foods from this animal source. Fats are found in meat, milk and its products, such as butter

and ghee, and in eggs. The protein is found in meat, milk, cheese and eggs.

All of these foods are capable of yielding energy and heat to the body, but only the one class called proteins are capable of building up our body tissues, repairing waste and providing growth. It is important, therefore, that we know these various classes of food and acquire ability in making a proper selection for our diet.

The most simple classification of types of nutrients is the following:—

1. Tissue Builders:—

   Proteins,

   Mineral Salts,

   Water.

2. Energy Yielders (Heat and Activity.):—

   Proteins,

   Carbo-hydrates

   (Starch, Sugar.)

   Fats.

3. Regulators:—

Mineral matter,
Water,
Vitamines.

A food material usually contains more than one nutrient. The cellulose which forms the framework of plant foods is not a nutrient, but is desirable in the diet. Carbo-hydrates are the cheapest source of energy and are always found to be the basis of economical diets. The race has learned to depend upon grains and by a study of this chart, showing the composition of your Indian grains, and comparing it with this showing grains native to the Western World you will see that the food habits of all peoples of the globe are well founded.

	Protein.	Fat.	Carbo Hydrates.	Ash.	Calories per lb
Jowar	9·3	2·0	74·5	1·7	1587
Bajri	10·4	3·3	73·0	2·0	1580
Kodra	7·0	2·1	77·9	1·3	1620
Rice	7·3	0·6	78·9	0·6	1620
Wheat	13·5	1·2	71·1	1·7	1635
Oats	11·8	5·0	69·2	3·0	1670

Rye	12·2	1·5	73·9	1·9	1620
Corn (Maize.)	9·5	3·6	72·7	1·7	1685

The percentage of carbo-hydrate runs about 70 in all grains. The method of milling in the Western Hemisphere is performed so as to remove most of the outer coats of the grain. Unfortunately much of the valuable mineral matter and protein is thus lost. But if the body is to avail itself of the entire grain we must see that thorough, long cooking is given to the starch. Few people cook cereals long enough and consequently much indigestion results.

Bread is unquestionably the "staff of life" but unless it is porous and well baked, it may prove a "broken reed" to lean upon. A study of the starch granule and its hydrolysis is one of the first lessons in cookery, and should be understood by all who are responsible for the preparation of food.

This chart illustrates graphically the composition of the pulses, which you see have in addition to the high percentage of carbo-hydrate, a large proportion of protein.

	Protein.	Fat.	Carbo-hydrate.	Ash.
Wal	22·4	1·4	60·7	3·4
Chola	23·1	1·1	59·5	3·6
Math	23·8	·6	60·8	3·6
Mug	22·2	2·7	59·9	4·4
Gram	21·7	4·2	60·0	2·6
Tuver	22·3	2·1	62·1	3·0
Guvar	29·8	1·4	53·9	3·1

The people of the Western World in speaking of a vegetable diet, think naturally of a diet largely composed of green succulent vegetables; but I find in India the vegetable diet is largely one of the dried pulses and cereals. A diet combining both types and used in sufficient amount, can easily furnish the body with all the nutrients needed, if supplemented by milk.

Milk is the natural food of mamals, being a perfectly balanced ration for the young. The chart indicates its composition showing a good protein content. As for the fat, buffalo milk furnishes twice as much as cow milk. Milk should always be used plentifully by people who are not meat eaters.

No doubt this idea had much to do with

the law governing the care and respect given to cows and buffaloes. It is a great pity that more attention is not given to their breeding and care, for the percentage allowance of milk per capita in India is extremely low. There is need of more general and more scientific dairying.

All foods contain carbon, hydrogen, and oxygen, but protein food alone supplies the body with nitrogen. " Nitrogen is necessary to the construction of body proteins which are essential to the life of every cell and are the chief part of muscle tissue ". Growth is impossible to a child or health to an adult without it, for there is a constant wastage of nitrogen as a result of the internal life of the cell. " The proteins are complex compounds of incompletely known chemical structure, though now regarded as essentially anhydrides of amino-acids ".

" The name protein stands for a number of related substances made from simpler substances containing nitrogen. These are called amino acids. There are seventeen of them that may be likened to the letters of the alphabet. They can be joined together chemically to form proteins as letters are joined to make words. It has been stated

that there are 350 million times a million, different combinations using only a single representative of each. Pulses, milk, grains or corn, eggs, meat, fish all are built from the same "building stones" or " letters of the protein alphabet " , and contain all the essentials for constructing different body proteins. Some proteins are called " incomplete " because certain amino acids have been left out, and if these proteins should chance to be the only ones fed to children, they could not grow. Belonging to this class are gelatine and some vegetable proteins such as gliadin. On an ordinary mixed diet of milk, eggs, meat, fish and variety of vegetables one need not fear securing a good assortment of amino-acids. But when one confines himself to vegetable food in which incomplete proteins are more frequent, there is more danger from lack of insufficient amounts of some amino acids, and the combination with such a diet of milk or cheese would be wise."

The dietaries I have investigated in Baroda, indicate a meagre use of the pulses and of wheat and an even more meagre use of green vegetables.

It is sometimes difficult to make people realize the value of green vegetables. They are usually expensive (even when one grows them in their own garden) and they contribute but little toward the total food-requirement of the body. Their large water-content, makes one question whether they are of sufficient value to warrant their cost. As a matter of fact, the body requires a certain amount of bulkiness in the diet to guarantee good digestion and the cellulose or woody -fibre of the vegetable serves this purpose. Further more, they are the chief sources of mineral salts which are essential to human nitrogen. nutrition.

" Iron is an essential element of hemoglobin and chromatin substances, and is an intrinsic part of every cell in the body. Without iron it is impossible for the blood to carry oxygen and if this function is interfered with, (metabolism) and the putrification of the blood is impossible. It is not only directly concerned with the process of oxidation, but also of secretion, reproduction and development. "

It is much easier to keep the body in a normal condition than to supply it with iron,

when it has become anemic. Physicians give medicinal iron, but while this metallic iron has a tonic value, unfortunately, it has not been proved that it can serve as material for hemoglobin and red blood corpuscles. That we can utilize the iron provided in the food stuffs has been proved and that it is assimilated and used for growth. Green vegetables are necessary in supplying this iron.

Calcium or lime, is another important mineral that is found in especially large quantities in milk, fruits and some vegetables. Calcium is necessary in maintaining the natural alkalinity of the blood. There is no danger from an over supply of lime, but great danger to the bodily health, if there is too little lime. Of the other important mineral salts,phosphorous and potassium must be specially named.

In computing a dietary it is just as important to see that there is a sufficient proportion of these mineral salts supplied by the food selected as to see that the total amount of fuel for energy is ample and the percentage of protein is sufficient to maintain equilibrium. These are by no means all of the minerals which the body

needs. We must also have Magnesium, Sodium, Chlorin, and Sulphur. These eight chemical elements are the most important, and body contains the others only in minute quantities.

They exist in the body and take part in its functions in three ways:—" As the constituents which give rigidity and comparative permanence to the skeleton. As essential elements of the protoplasm of the active tissues, and as salts held in solution in the fluids their characteristic influence upon the elasticity and irritability of muscle and nerve, supplying the material for the acidity or alkalinity of the digestive juices and other secretions, and yet maintaining the neutrality of slight alkalesence of the internal fluids as well as their osmotic pressure and solvent power ".

Foods rich in iron are dried pulses, entire wheat, peas, raisins, or dried grapes, prunes or dried plums, eggs, and lean beef.

Foods rich in calcium are:—Almonds, walnuts, dena, pulses, milk, oranges, dried plums, egg-yolk.

Foods rich in phosphorous are:—dried pulses, egg-yolk, entire wheat, dena, almonds, walnuts,

beef, dried plums. If a diet is provided including some of these food stuffs, it would be a healthful safeguard. The following suggestions taken from an American Food Emergency bulletin are important for conserving these essential nutrients.

(1) Water in which vegetables are cooked should be either served with the vegetable or used in making of soup.

(2) Potatoes should be cooked in their skins and this is also true of many other vegetables and fruits.

(3) Unhulled or brown rice is greatly to be preferred to polished rice from which much valuable material has been removed.

(4) Fine patent flour is difficient in both mineral salts and vitamines.

(5) Milk should be the last thing excluded from a diet for children, because it has many advantages as a tissue building and growth-promoting food. Two seers of milk a day for every child is a good rule.

(6) Skimmed milk despite its shortage of fat is as valuable a source of mineral salts, vitamines and protein as is whole milk.

(7) Ordinary " greens " are an excellent source of mineral salts.

The most recent discovery in the science of nutrition concerns that of vitamines or "accessary food substances. " They occur in minute quantities and have been found to be essential to growth and to complete nutrition. If these are not included in sufficient quantity in a child's diet, its growth is impeded. In the case of adults, lack of vitamines results in certain diseases, best known among these being " beriberi ". This disease is found to be prevalent among people who eat rice, which has been polished, and other corn that has been finely milled, thus removing the entire outside coating of the grain. The cure for the disease has been found by insisting upon the use of unpolished rice, whole grains and a plentiful supply of milk, pulses, eggs, beef, fish, fresh vegetables and fresh fruits which contain these elements. Foods relatively poor in vitamines are sterilized milk, clarified butter,

sterilized meat, cabbage, turnips, carrots, highly milled cereals, starch, dried vegetables, dried fruits.

"Individuals restricted to a diet of dried and cooked foods especially if limited in variety, run the risk of developing scurvy which is readily cured by the addition of fresh fruits such as oranges, lemons, limes, potatoes and cabbage. Babies fed on cooked milk or dried and prepared foods run a similar risk."

It will be noted that "vitamines" are not found in clarified butter, boiled milk, dried vegetable food, and since these constitute the chief foods in the Indian dietary, it would be well to always add fresh food such as uncooked fruits and vegetables to the diet and see that there is variety in the kinds of grains and pulses from time to time.

Another point to be considered in the selection of food is whether it is an acid or a base-producer. The blood must be maintained in a natural alkaline condition for health. Even a slight tendency toward acidity means ill-health and it is safest to choose foods which are known to be base-producers and to avoid a predominence of acid producers in the diet.

Base producing foods are:—Dried pulses and plums, raisins, dena, dates, carrots, plantain, papaiya, cauli-flower, cabbage, mula, lemons, oranges and limes. 'It must be noted that acid-*tasting* foods are included among the *base*-producers.

Acid producers are:—lean beef, eggs and mutton, wheat, white bread, rice, fish, chicken, pork and veal. These are the general points to be borne in mind concerning the nature and classification of food stuffs.

Their analysis and composition with respect to dietary computations will be the subject of our next discussion.

Lecture III.

III

The student of to-day comes to the study of dietetics with much of the preliminary work already accomplished. There have not been such complete analysis of India's food-stuffs made as will be necessary, if this subject is to be carried a matter of serious study.

The scientists are able to determine the amount of heat each food is capable of furnishing, by means of a " bomb-calori-meter ". The bomb-calori-meter consists of a heavy steel bomb with a platinum or gold plated lining and a cover held tightly in place by means of a strong screw collar. A weighed amount of the sample of a food substance, is placed within the bomb which is then charged with oxygen with a pressure of at least 300 lbs or more to the square inch, closed and immersed in a weighed amount of water.

By delicate an accurate calculations from the differential thermometer, capable of being read to one hundredth of a degree, the number of calories arising from the combustion of the sample of food stuff is calculated. The Calorie used in this work would be understood to mean the greater Calorie, that is the amount of heat required to raise the temperature of one kilogramme of water, one degree Centigrade. By this method we are able to determine exactly how much heat will be liberated by the metabolism of an exact weight of food. The following is a list of the approximate amounts of some common food-stuffs that will yield 100 Calories. We speak of them as " One-hundred calorie portions ", and study has proved this to be an easy means of estimating the food value of a dietary.

In order that you may visualize the portions, we have weighed out the proper number of grams of some well-known foods for you to see.

List of One-hundred-Calorie Portions.

Milk	$\frac{5}{8}$ cup, whole.
	$1\frac{1}{8}$ cup, skimmed.

Cream $\frac{1}{4}$ cup, thin,
$1\frac{1}{3}$ table spoonful, thick.

Butter, Ghee, oil, or any fat— 1 table spoonful.

Bread, 1 slice, 3 inches by $3\frac{1}{2}$ inches by 1 inch.

Chupattis	—one.
Orange	—one-half.
Sweet-lime	—one.
Plantain	—two small ones or one medium size.
Dates	—four or five.
Figs	—one and a half.
Eggs	—two small or $1\frac{1}{2}$ medium.
Potatoes	—one medium size.
Sugar	—one table spoonful.
Tuver dal soup	—one-half cupful.
Rice (cooked)	—Three-fourths cupful.
Almonds and dana	—one-half ounce.

The next problem for the dietition is to determine how much food is needed. We all recognize that varying amounts are needed by different people. The factors governing the food requirement are chiefly age, weight, shape and

activity. By means of the " Respiration-calorimeter " experiments have been performed to determine the requirements of a man at sleep, at rest, standing, walking and working at different occupations. This calorimeter is large enough to hold a man, and many have been willing to live in the machine for several days in order that scientist might estimate their bodily needs.

It was rather humilating to find that mental work used very little enegry. When the man sat reading a book, there was no appreciable variation in the register of energy expended; but when he lifted his hand to turn the page the energy required for this task immediately registered such an expenditure.

The body performs work continuously and some of its activities are beyond our control. The voluntary work of the body for digestion and assimilation as well as of the circulation, and the maintenance of the muscular elasticity is much greater than most people realize and it cannot be stoped during life. If we do not supply food, the body will consume itself until exhausted. This is what occurs in famine. But the body needs more food than merely to keep

it alive, if we are to really live; and the energy necessary for work and play comes from the food which we eat. The method of determining the food requirement for an individual is based upon the experiments with the " respiratory calorimeter" and upon wide investigation of actual dietaries among people of all classes. The method for computing an individual's food requirement is now a much simpler matter than formerly, thanks to the exact work of the nutrition experts. The availability of nutriants, the ease and completeness of digestion and metabolism, have all been matters of detailed study. With such knowledge to guide one in the selection of the food it only remains to determine the quantity required for the various types of individuals under varying conditions. Naturally, food habits and personal idiosyncrasies must be considered, as well as the local market. The number of meals and the time of eating differ among different people, but the total requirement would be governed by the same factors.

Atwater and Benedict have derived the following estimates of the average rate of metabolism under different conditions of activity.

Man sleeping ...	65	calories	per hour.
Man sitting in rest	100	do.	do.
Man at light muscular exercise.	170	do.	do.
Man at active muscular exercise.	290	do.	do.
Man at severe muscular exercise.	450	do.	do.
Man at very severe muscular exercise.	600	do.	do.

By the use of these estimates the probable food requirement may be calculated very simply, as, for instance, in the following example:—

8 hours of sleep at 65 calories	520	calories.
2 hours light exercise at 170 calories.	340	do.
8 hours active exercises at 290 do.	2320	do.
6 hours sitting at rest at 100 do.	600.	do.
Total food requirement. for the day.	3780	do.

These are only rough statements and many

modifying factors must be taken into consideration in computing the dietary requirements of different individuals. But age and activity are the chief factors.

The following daily ration is suggested for a man at moderate muscular work:—

1. $1\frac{1}{2}$ Seers of bread or approximately one-seer of ... ... Wheat flour,
   Bajari flour,
   Jowar,
   Kodra,
   Rice,
2. $\frac{1}{4}$ Cup ($\frac{1}{8}$ seer) of Butter or,
   $\frac{1}{4}$ Cup of oil or ghee.
3. $\frac{1}{4}$ Cup ($\frac{1}{8}$ seer) of sugar or jaggery, or
   $\frac{1}{3}$ Cup of honey, treacle or jam.
4. $\frac{3}{4}$ seer of ... ...Moderate fat meat,
   or 3 seers milk. Poultry,
   Fish,
   Eggs.
   or
   Dried pulses, tuver, gram, mug, masur guvar, matki, chola, wal.

5. $1\frac{1}{4}$ Seers of fresh fruits and green or root vegetables.

This would be insufficient for a man at hard muscular work and would be too much for a man at a sedentary occupation. Unfortnately, we cannot be sure in prescribing a diet for people that the food will be well cooked, so that it is not wasted, either by the method of preparation or its indigestibility. The energy requirement for children is higher in proportion to body weight than that of adults. The process of growth necessitates more rapid metabolism and a greater storage of food materials. In six months a baby doubles its wight, in a year triples its weight, and in two years of age has quadrupled its weight. Therefore the standard for children should be on a higher scale of food requirement than for adults. Those foods which give protein and are necessary for the growth of body tissues, should be liberally provided. The proportion of protein foods should not run less than twelve per cent, of the total food requirement for adults and for children should not fall below 15%

The following list indicates the distribution

disastrous in the case of growing children and of child-bearing women. He places the minimum at 10% protein, but strongly advocates a diet containing at least 12% of protein. Dr. Sherman describes the human being as an herbivorous animal rather than a carnivorous and recommends a diet based upon the natural food of all mamals, namely milk, with a generous supply of fruits and succulent vegetables. If the total number of calories is sufficent for the individual needs, it matters little from what source these calories come, so long as the protien equilibrium is maintained and a sufficient amount of mineral matter supplied.

The nutritive requirement of an individual is largely based upon weight, age, shape and activity. Sex has less to do with food requirement than is supposed, the popular idea that a woman is usually only about three-fourth as large and is supposed to do less active work.

In my brief, and necessarily superficial investigations since coming to India, I find that the percentage of protein runs much lower than standard requirements. The percentages so far as computed for the family living on an average

income of Rs. 20/- range between 5.7% and 8.% protein. The total calories are high, but the protein percent is dangerously low according to our standards. It is remembered that a protein diet is heating to the body and presumably, people in a hot climate naturally select a diet low in protein. It was unquestionably intended, judging from the laws of Manu, that the vegetarian people should make milk the basis of their diet, as Dr. Sharman also advocates.

The theoretical " balancing ' of the diet is not always successful in practise. We must not fail to consider the human mechanism as carefully as that of the most expensive motor car, or engine. Much depends upon the way in which the fuel is fed. Its behaviour in the digestive tract is largely controlled by our customs in eating. " The purposes of digestion are:—(a) to bring all foods into a fluid form, (b) to separate all proteins into their amino acid fragments, (c) to divide all fats into their two components (fatty acids and glycerol), soluble in the digestive fluids. And (d) to divide all carbohydrates into their component parts, (simple sugars.) In such simple forms foods pass into the blood stream and thence into the tissues.

Some people assimilate their food much more perfectly than others and some foods are more completely metabolized than other foods. An astonishingly large amount of food is utilized by the body in maintaining the body processes. It is only the surplus which may be used by us for our voluntary activities in work or play.

" Feeding the family " means considering their individual needs, their preferences, the cost of the food, its preparation and digestibility. On no subject do people hold more fixed ideas, concerning nothing is there greater real carelessness and ignorance practised by the world at large; but there is nothing of more important concern to health and physical well-being. In a land that looks upon the process of food preparation as a holy ceremonial and respects diet as it deserves to be respected, I feel sure the people will come to appreciate scientific knowledge upon the subject. It will not suffice to merely teach cookery in the schools, that is being taught at home; the girls must receive simple but scientific understanding of how to feed the family in order to keep them well, provide for the children's growth and supply sufficient energy to all for efficient living.

After all is said and done, it is by no means our purpose to nourish the body, merely for physical perfection. We wish to supply the body with its proper nutriment in order that its functions may be so performed, that the mind may be left clear and alert and the spirit at peace, to direct the activities of the body for worthy, useful, efficient enjoyable activities.

Lecture IV.

IV

The world is familiar with the happy phrase of the President of the United States of America indicating the purpose of the present war. We are fighting "To make the world safe for Democracy". May I adapt this, and say that the aim of Household Arts is "To make the world safe for living".

As I journeyed westward, I became aware of "fears" with which I had never been before confronted. One ~~calculated~~ cautioned me that I must fear the sun, another emphasized the need of fearing water; a third said milk and fruit were to be feared. Personally I was afraid of the dirt. These fears were further augmented by friends in China, who insisted I must travel no further without being vaccinated for "Small-pox", and the Doctor added inoculation for typhoid and typhus fever. No sooner

had I reached Baroda than I was advised to be inoculated for plague. Now there is still Cholera, Malaria and snakes to be afraid of and that dread Tuberculosis which lurks everywhere.

We do not need that the world be made safe for us "to be well"? It has been shown by statistice in America that all those diseases which can be prevented through "public control" have been enormously reduced. It is only when the protection depends upon individual control that diseases increase. The individual is inert, careless, indifferent apparently, to his own health.

Have we no ambition to seek physical perfection as well as intellectual and spiritual perfection? You don't like pain. Illness is not pleasant. It costs you time, money and energy. Our appreciation of ideal health needs awakening and our sense of responsibility for securing and maintaining it.

The subject matter with which we have to deal, is so common-place, and the truths are so obvious; it is difficult to arouse an interest in

such every day facts. It is only when we lose our health that we come to realize its value. A man will wastefully spend his health to secure wealth and then must spend his wealth in a vain search for the health, which he has squandered.

One might say that the laws of physics were commonplace, but we are beginning to appreciate what progress has come to the world by the application of its principles. Our ability to communicate by telephone, telegraph and wireless would have appeared magic a century ago. Our knowledge of electricity may be slight but we are all willing to use the electric lights. We would think the person extremely foolish who would blunder along a dark passage running the risk of bruises and bumps, because he did not reach up and turn on the electric lights. So we may not understand the natural sciences but we are absurdly foolish, if we do not make use of the knowledge which is given us.

It would be fairly easy to dazzle you with scientific terms and abstract phraseology. Great geniuses have always been able to put their thoughts into simple language, to use homely

illustrations and to be natural, direct and unaffected themselves. I am not a genius unfortunately, but I shall employ as simple language as I can, for my desire is to impress upon you the importance of using the truths which the scientists have proved whether you thoroughly understand the steps by which these facts have been discovered or not. To illustrate in a homely fashion how our lack of interest or sense of responsibility is to a great extent the cause of the "fears" with which our lives are surrounded.

Fear itself is the root of much ill health and if we would be well the causes for fear must of necessity be removed. We have spent some time, during this series of talks, discussing the scope of the food problems which Household Arts undertakes to study. We see that it is possible to determine how much, and what kind of foods an individual requires under varying conditions of climate, age, size, and activity.

We know the composition of foods. We understand the art of combining and preparing these foods. The body mechanism is perfected so as to digest the food when eaten. The circulatory systems are there to carry the nutrition

to the cells. The processes of metabolism are perfected. And yet we may easily prevent our bodies from securing any benefit from the food by our carelessness or fears.

We likened the body to an engine needing fuel in order to produce heat and energy. That is a fairly good simile. Have you all had experience in building fires in a stove? You know that the fuel may be quite good, but if there is no draft, it will not burn. Fires are smothered out from lack of air. Oxygen is necessary if combustion is to take place. The products of combustion we know to be, water, carbon-mon-oxide and carbon-di-oxide. The processes of oxydation of the fuel, sets free heat which is transformed into energy. If the fire burns some time, ashes and clinkers accumulate as the waste product of combustion. If they are not removed the fire burns down and smolders or goes out.

We may feed the human engines with the right fuel but it will merely burden our bodies unless air with its pure oxygen, is breathed in to consume the fuel we have eaten and digested.

This air is much cheaper than food, + it is

free for the taking, and like most things for which we do not have to pay, is not appreciated. We are lazy about our breathing and only half fill our lungs when we breath. We build our houses so as to exclude the air; we contaminate the air with the waste products of our lungs and bodies and of factories and houses. We do not consider whether we are getting all the air we need. I wish I could create such an appetite and liking for plenty of clean air, that you would hunger for it, as you do for your food.

Fatigue has recently been subject of much study. We know that one of the chief causes of the feeling of fatigue, that tired feeling, is the presence of carbon-di-oxide in the body. Sleep is a process of ventilation, or it is intended to be. When the body is relaxed in sleep we are wasting less fuel. If we continue to breath in a full supply of oxygen from the air, the carbon-di-oxide is driven out, the body is repaired after the days work, we arise refreshed and invigorated to take up the tasks of the new day. For the body to secure this rejuvination, we must give it a certain length of time to perform the task of repair. We must truly relax and must acquire the habit of lying out at full length,

when we sleap, instead of huddled in a heap. The bent joints retard circulation. Then we must see that the body is supplied with all the oxygen it needs for performing the functions of repair and ventilation.

It has been determined definitely, that with pure clean air the body makes use of at least 3000 cubic feet per hour. Each individual person requires this amount. Do all receive their due ? Out doors we take this quantity, though in some districts of a crowded city, the quality is not that which it should be. But in the house both day and night, it is a serious question, whether each member of the family has the space which this volume of air demands.

A simple way of estimating the required space is to allow a floor area of ten feet square and a ceiling at least ten-feet high. In India ceiling should be fifteen feet high, but that should not lessen the floor space allowed. The air of this space would then have to be renewed three times per hour to supply the necessary amount of air for one person.

Yesterday I visited a house in Baroda where

a man and his wife with four children live in a ten-feet square room, with a ceiling below the required height. It did not stand alone. There were groups of similar ones crowded nearby. At night when the six are asleep are the windows left open ? Is the air changed eighteen-times an hour ? That would be rather a stiff breeze, and we know that the breeze does not exist. No, the windows and doors are shut and if I am to judge by the way in which I have seen people sleeping on the railway platforms, and servants sleeping on steps and hallways, their heads are completely swathed in a cloth.

Can people living and sleeping without sufficient air be strong and well ? They cannot. They are poisoned by their own breath and by the organic matter and gasses given off from their clothes and bodies.

It is doubtless true that a large proportion of the thirty-seven per one-thousand of the population who die annually in India, die from sleeping without sufficient pure air. That figure is more than double the percentages of deaths among people, who appreciate the necessity for plenty of clean air. I could read you a long list

of diseases, which are apt to be contracted by those whose vitality has been lowered in this way. We have proofs in plenty of the evil effects, less extreme than the Black Hole of Calcutta, but equally fatal.

It is however the determination in health standards, which results from persistent and over-crowding, that has the most insideous effect upon people. They come at length to believe that the lowered vitality which they have, is a normal state of health. They do not know what it really means to be well. Oxygen starvation is a type of famine that does its deadly work all the year round.

It is equally as important that the air we breath be pure and clean in quality as that we have a sufficient amount. Perhaps, we cannot control the public nuisances or our neighbour's carelessness in house-wifery which permits the contamination of air we must breath, but we can see to it that in our own compounds and houses, no causes for polution of air are permitted to exist.

Do you realize that one lamp uses up as much oxygen, as six people require, and give

off six-times as much carbon-mon oxide and carbon-di-oxide ? The charcoal stoves are another source of danger when burned in a close apartment. The poisonous gasses given off by the " Shegri " are known to have caused death. Oil, candles, gas, all polute the air. It is necessary for us to realise then that when lamps or stoves are burned in a room, we must provide much greater supply and see that a current of air and outlet are arranged to carry the foul air out of the rooms. Loss of strength, sleeplessness, loss of appetite, indigestion, depression, unhappiness, and lack of power to concentrate and sustain effort either of body or of mind are frequently the results of breathing such foul air.

Our bodies also give off moisture or watery vapour about ten ounces in every twenty-four hours, and frequently depression is due to the excess humidity engendered by too many people remaining in a close room. Organic matter is also exhaled, which promotes the growth of microbes.

" Dust and its Dangers " is a little book written by Dr. Prudden. But as one physician recently stated " dust has no dauger in itself. "

The danger is due to the fact that Bacteria use the dust particles as air-ships, upon which to sail about. One tiny mote may be seen under the microscope to carry millions of bacteria in colonies of several varieties. Naturally, if these particles of dust are breathed into our lungs, the bacteria are breathed in too.

Where do these disease-producing bacteria come from? How are we to destroy their source and prevent their entrance into our houses?

Decomposing vegetation not only furnishes good food for breeding bacteria and mosquitoes, but the products of this decomposition are poisonous gasses. Sulphurated hydrogen is produced in waste heaps. The effect upon the system of breathing in even one part of sulphurated hydrogen in seventy-thousand parts of air is dangerous; while air containing one to two parts per thousand kills very speedily. Minute quantities produce headache and depression.

Garbage, waste of all organic material, is just the food bacteria are looking for. They "love darkness better than light, because their deeds are evil," and a damp media is their

natural habitat. Therefore knowing what they like, let us see to it that they do not get it, and have things so clean, that bacteria will have nothing to live upon. Most of the disease-bacteria are thrown into the air from the bodies, lungs, skin, effluvium and excreta of diseased persons. It is therefore important to segregate those who are sick and to see that all waste products from their bodies are burned.

The sputum of a tubercular person contains the virulent bacillus of that disease. Let it be expectorated upon the floor or ground where it dries, and the breeze caused perhaps by some one's sari, throws it into the air where it is breathed into some one's lungs. Laws have been passed prohibiting spitting in America, and we have lowered the death rate from tuberculosis to an amazing extent. Consider also the method of " sweeping and dusting " commonly practised in India, and its effect upon purity of the air. Of this I shall have more to say another time.

Exercise is one of the means, whereby deep respiration in induced. and exercise is one of the necessary factors in maintaining health. Not only must the body have rest and plenty of it, it

must have work in order to stimulate the circulation of the blood and send it racing over the body carying its nutrition to the exercised parts and so strengthening them. The glands and organs became sluggish, and fail to perform their functions, when exercise is neglected. The " ashes " and " clinkers " or waste products of digestion and metabolism accumulate. The result is much like the process, which has been described taking place in " the compound " if refuse is allowed to stand in a dark, damp place. Putrification takes place, harmful bacteria multiply and sulphureted hydrogen devolves within our intestines. The proteins may break up into purin bodies, and these passing into the circulation actually poison us. " Auto-intoxication " is the term used by the physician. Poison from putrid food stuffs not properly eliminated, is the plain fact.

One of the best means for keeping the body clear from such accumulations is by drinking plenty of water. Water helps to eliminate waste products. One is no more clean, who fails to drink plenty of water, than one who does not bathe sufficiently. Several glasses of water, the first thing in the morning is a fine prescription

for health. The water passes rapidly through the stomach and flushes out the whole alimentary tract. How much water does one normally need to drink ?

One might first ask how large a part of our bodies is composed of water ? A man weighing one-hundred and fifty-four pounds has really one-hundred and eight pounds of water necessary. (79 % of the blood, 80% of the brain and muscle, 10 % of the bone is water.)

The same questions of quantity and quality confront us in considering water as a health factor as in considering air. Three quarts of water a day, that is about six-seers, is none too much. Three seers is the least one should take, over and above what you take with your food. Some cities consume daily sixty gallons per unit of population. I understand Baroda uses also a high percentage quantity. But of course this is used for more purposes than drinking.

The water we drink has more important uses than to satisfy thirst. The body tissues must possess a normal supply of water and unless the glands

receive all they need for their secretion they will take it from the tissues. Sufficient secretition are necessary for digestion and metabolism.

It will be seen therefore that water is as important for the body as the food which actually supplies the calories; for without water the food cannot be made soluble for digestion. Water is also as important a factor in the regulation of body temperature as for the proper elimination of the waste-products of digestion and metabolism.

The quality of the water supply is most important. If bacteria are in the water, when it is taken into the body, there is little chance of their being destroyed by the acids of the stomach; since water passes very quickly through the stomach, thus carrying the germs into the intestines, where the alkaline medium is most favourable to their development. In many places, people are dependent upon springs, rivers, tanks, or wells for their water supply, not having the splendid sanitary water system provided for people of Baroda. I wonder if you really appreciate what a great benefit His Highness has conferred upon you in providing this safe source

of water ? It is not sufficient to have the source of supply pure, if people will not care for it properly after it enters their home. Unclean vessels or vessels left open to the dust will rapidly polute the water.

In your Yajurveda, the part called Arana contains the following commandments " Do not spit out with retching in the water. Do not drop blood into water. Do not throw any hair or nail or bones or ashes nor dip dirty clothes into water. For to do so is to abuse the precious gift of the gods and disgrace them. "

The great law-giver Manu in chapter for Manava Dharma Shastra says:– " Let me not cast into the water saliva nor clothes, nor any other things soiled with impurity nor blood, nor any other kinds of poisons. If these laws are obeyed, it would be much better for India. During my walks about Baroda, I have seen many instances of water contamination. The well with its tanks of water on top makes a fine place for a man to stop and wash his Dhoti. He dips it into the water and slaps it against the concrete sides of the well

allowing the dirty water to run back, thus poluting the supply for others. The Masak of the Bhisti and the Kos of the Kunbi are relics of times when more sanitary buckets and water containers were unprocurable. Watch the water drawn by bullocks from a well, see the skin emptied over the man's feet and then drop back, the relaxed rope dragging through the dust of the road, carrying quanties of dirt into the well. How often are the skins cleaned ? How safe is such water ? As I travelled north from Ceylon to Bombay, I saw many tanks in which people were bathing, washing their mouth and spitting the water out again, others were washing their clothes, while themselves standing waist-deep in the tank. Animals of various kinds were using the tank for bathing and drinking purposes and women were carrying jugs of the same water to the houses for cooking. Such unclean habits polute the supply. Such water taken internally is the direct cause of Cholera, dysentary, goiter and typhoid fever. Its external use is the cause of oriental sores, ring-worm and other skin diseases.

We have reviewed some of the physical needs air, sleep, exercise and water, which are

intrinsic factors of the nutrition of man. Personal hygiene and sanitation are so intimately associated with Household Arts as to constitute a part of the course. We study them not as issolated, but as contributing subjects to Household Arts. When associated with practical work of housewifery the subject matter of hygiene and sanitation are motivated and made interesting. Children do not like being preached to any more than do adults. If the lessons in cleanliness and right living are made a part of the housewifery work, in a domestic science lesson, the facts are accepted more willingly than when given in a didactic reading lesson.

Do not imagine that we consider such material factors, all that are necessary for right living. A prominent physician in Boston, Dr. Cabbot, has written a book entitled " What Men Live By ". His answer to this question is " Work, Play, Love and Worship ". There is no discounting the fact that congenial work, amusement, a harmonized domestic environment, spiritual peace and mental refreshment, are necessary for health. Only with the possession of these can we come to know, what we truly mean by the " Joy of living. "

Lecture V.

V

In some countries the selection and construction of wearing apparel is a matter of much more far reaching importance than in India where a standardized dress has been adopted long ago. The Sari fulfills many of the basic requirements for dress established by authorities upon the subject. You have succeeded where we have so far failed in convincing people that a standardized dress is the best. The Sari allows perfect freedom to the body, it may be bought for little or much according to the means of the individual; it can be easily cleaned, and it does not require a great deal of difficult construction, however much skill is required in draping it. It provides proper ventilation to the skin and it allows great freedom of expression in the choice of colour, texture and trimming. It is universally becoming and lovely.

One might well ask then why waste time discussing the subject further? I must remind you that we are here to review the content of Household Arts, and to see what is commonly included in the subject. Some phases will be more important to India than others. And these are the things that will be selected in making up a school programme.

It is interesting to note in the review of the History of Costume how little part either health, comfort or modesty played in its development. The study of the history of dress and of shelter is one of the most suitable lines of approach to the subject, and one always enjoyed by girls. You know the earliest motive which prompts people to wear anything on their bodies, is the love of display. From the primitive American Indian who puts a feather in his head-dress to advertise the fact that he had achieved some new conquest, or a scalp in his belt as proof of having slain his enemy, down to modern times where the man of wealth buys fine laces and jewels for his wife to display to the world of society his prowess in the world of industry, the same idea shines through. Nor is it difficult to see similar evidence in the common

disregard of cleanliness or modesty in the dress of the Indian, who frequents the streets doing the manual work of the community, wearing her wealth about her ankles or in her nose.

Some curious practices have grown out of the desire on the part of people to prove their special prestige. The Chinaman who binds the feet of his girl baby, is demonstrating to the world that he can maintain his women folk as ladies of leisure; they do not need feet. Is this not the purpose whether conscious or otherwise, of the girl who apes the high heels or long trains of the woman of wealth, who can wear shoes for ornament not having to walk ?

Why do we wear clothes ? What kinds of clothes are most appropriate to our particular conditions of life ? How may we judge the quality of the fabrics which we buy ? How may we best maintain our clothing in good condition ? What should our clothes cost ? These are some of the practical problems that the students of Household Arts seek to solve.

As a basis for the solution of these problems the study of textiles is made quite as thoroughly

as the study of food is undertaken in the interest of nutrition. The production of the various textile fibres are followed through the manufacture of the fabrics to the place of distribution. This involves both an economic and scientific study of cotton, linen, wool and silk, and their commercial products. In the laboratories the fibres and fabrics are subjected to both chemical and microscopic tests that enable the student to determine the composition and adulteration of cloth. This did not use to be a necessary part of a woman's fund of knowledge. She was formerly able to tell by the feel of silk that it was of good quality, but the manufacturer has learned to stimulate the texture and to weight the fabric with tin and other metals to make it heavy. Artificial silks are also made to deceive the unwary.

The chemistry of textiles also includes the work with dyes and detergents, for cleaning and renovating are an important part of the economics of house-keeping.

In all cold climates dress is more important as a matter of necessity than in warm ones, but there are parts of India where clothing is as

much a problem as in England or America. The object of dress is the same, though conditions vary and the means of attaining the object naturally differ. In clothing the body for health the chief aim is that a "constant temperature" be maintained, and the body kept dry and clean.

Physiology teaches us how the body endeavours to maintain a constant temperature. In case of sudden cold the nerves of the skin cause a constriction of the blood vessels, causing the blood-flow to the internal organs to be greater, and by increased oxidation, the generation of more heat. Not only by this chemical means but by physical processes of conduction, convection, and radiation, by perspiration and its evaporation does the body seek to regulate its temperature which must be maintained if life is to continue normally. Where there is insufficient clothing there needs to be an increased food supply. A man who blankets his horse or stables his bullock will not need to feed him so much in cold weather. It might be stated as one of the purposes of clothing, to save body fuel.

Children require warmer clothing than ad-

ults, because their surface-area is larger in proportion to weight. For the same reason the proportion of food they require is greater.

The warmth of a garment depends little upon the nature of the fibre, but much upon its weave. Silk in a poor conductor of heat. Any fibre woven, so as to hold still-air in its meshes is warmer than a cloth woven with a smooth surface. You can see from these charts the comparative nature of the fibres.

This is cotton with the twisted fibre, which makes it possible to spin, though so short. It has many advantages and will doubtless always be the material most commonly used. Linen with its straight fibre can be woven, because it is so much longer than cotton. We know it is more difficult to produce and is more expensive than cotton. Both of these fibres may be woven with open air meshes for warmth or with close smooth weave for coolness. They have the advantages of cleanliness, ventilation and evaporation. Silk combines well with either of them. The Chinese wear silk over an open weave of cotton for warmth. They have learnt that two thin layers of clothing are warmer than one

heavy layer, because of the still air held between the two layers. There are other vegetable fibres of which we might speak. Ramie and one very similar known as, China-grass, Jute, Hemp, Pine-apple-fibre and Coir made from the shell of the cocoanut, are some most commonly used for clothing.

Silk, you know is spun by the silk-worm into a cocoon. The fluids secreted by the two spinnerets unite on issuing to form the double continuous thread of the raw silk. Its lustre and fineness and many good qualities make it a highly appreciated fibre. This chart shows the silk fibre under the microscope and you can here distinguish between the raw silk, which shows its two threads of protein material called Fibroline. They are seen to be held together by bits of gum or silk-glue, which in the raw silk appears as irregular masses on the surface of the fibres. This wild silk under the microscope is broader and coarser with diagonal lines, characteristic of Tussah. Both are distinguishable under the microscope from the artificial silk, which looks like cylindrical rods, having the appearance of glass.

This chart illustrates wool and hair fibres,

which have a common structure. The epidermal covering made up of overlapping cells like the scales of a fish give the appearance of serrations or saw teeth to the fibre edges. The scales of the true hair fibres are difficult to see except under a high-power microscope, but the scales of the wool-fibre which are set more loosely, show marked serration. The wool is soft and pliable tending to mat together and in so doing the serrated edges interlock. The hair on the other hand is firmer and has more spring and wiriness in the individual fibre and lacks the distinct serrations of wool. There are many qualities of wool. Old wool is often regenerated and used again in the form of Shoddy, Mungo, and Extract. Wool is the most hygroscopic of all the fibres holding from 12% to 15% its weight of moisture. It may even take up 30% to 50% of water, under such conditions it interferes with the evaporation of the skin.

One of the purposes of clothing is the ventilation of the skin. The sweat glands secrete about 50 ounces a day containing gasses and solids, while the sebaceous glands secrete oil. Perspiration needs to be removed to keep

the body in good health. It is easy to see therefore that the power of absorption of the various fibres is a matter of considerable importance, in selecting clothing for different climates or seasons. Silk is almost as hygroscopic as wool, but looses the moisture much more rapidly. It is considered ideal for underwear being a poor conductor of heat, but much more cleanly than wool. Cotton and linen are about equally hygroscopic. Linen yields the moisture more readily than cotton and therefore is cooler.

In comparing fibres and fabrics a thing of chief concerns is the ease and thoroughness of freeing the fabrics, of which the clothes are made, from the products of the skin. The fibres show great natural differences in this respect. Linen is the cleanest. It is smooth and lacks any natural oils. Cotton yarn contains oily matter. It has been proven that three times as much dirt clings to cotton as to linen and that twice as many bacteria are collected by the skin, when the body is clothed in cotton. On the other hand, cotton launders easily and can stand sterilization. Wool is the most difficult to keep clean. It is very hard to launder properly for any rubbing will cause the serra-

tions of the fibres to mat closely together and the fabric then looses its chief virtue, that of porosity. Bacteria flourish in the meshes of the wool and therefore if wool is worn next the skin it should be frequently changed. When wool is used as an outer garment, it must be remembered that though usually dark in colour and not showing the dirt, it holds a large quantity of dust and bacteria.

In answer to the question as to whether laundering clothes sterilizes them it has been shown that in order to really destroy the bacteria, it is necessary to steam them or to maintain a temperature of 150° F. continuously for some time. It is questionable, whether a hot flat-iron destroys bacteria, and alkaline soaps though acting as sterilizers must be used with discremination or the clothes themselves be injured.

The method of laundering has come to be a fine art. Our standard of cleanliness is largely dependent upon the customary methods of washing. Clothing washed only in cold water cannot be expected to be either scientifically nor aesthetically clean. It is necessary to know the use of chemicals and simple methods for

removing stains, without damage to the colour or the strength of the textile if perfection in laundry work is desired. The process of domestic laundering should follow the following sequence, sorting, removing stains, rubbing or soaking with soap and hot water, first on the right side and then turning and washing on the wrong side. After rinsing to remove any loose dirt, the clothes should be wrung out, soaped all over and placed in a vessel of clear cold water with a few pieces of soap. This should be placed on the fire and allowed to boil briskly, for five minutes, to keep the scum from settling on the clothes.

They should be again rinsed after boiling, in cold clear water to remove all soap. Then they may be rinsed again in blue water, made by adding indigo to clear cold water. It is important that all the soap be well rinsed out before putting in blue-water, as the soap and blue may combine and cause iron-rust. Some clothes are starched to stiffen them and make them look well and to keep them clean longer.

Clothes should be hung in the open air. Sunshine helps to destroy the bacteria and ma-

ke the clothes sweet and sanitary. It is distressing to see clothes hung in a dark hallway or basement room, when an excellent roof offers a splendid place for drying.

We need not go into further details, but the fact may be emphasized that soap can be made at home, from the oil that is otherwise wasted in cooking. It is a simple matter to make laundry-soap and this is one of the things that should be taught to school children, so that they can have soap for all cleaning purposes at home. Five seers of oil, three seers of water, half seer of lye, potassium or sodium carbonate is sufficient, though a spoonful and a half of borax and a one-fourth-seer of ammonia may be added. Dissolve the lye or sodium carbonate in cold water and set it aside to cool. The lye mixture should be stirred with a stick or a glass rod. If borax and ammonia are used add them to the lye-mixture. Fresh fat or oil may be used for making soap, but if cooking oil is used, it should be clarified by boiling in it several pieces of raw potato. The scum which rises should be taken off the top and the oil strained through a thin cloth. Combine the

oil with lye-mixture and let it boil until it begins to thicken. It should be allowed to stand until the consistency of honey before it is moulded. This is done by pouring it into a wooden box lined with several thicknesses of heavy paper, the top layer of which is first rubbed with oil. It should be allowed to stand in a moderately warm place until hard and may then be cut into cakes.

Garment construction forms another important part of this course. In the study of dress or clothing, we include the selection and care of all garments, whether of home construction or purchased ready-made. To select fabrics wisely and maintain them carefully, through a sound knowledge of their real values, is the chief purpose of this branch of Household Arts. The work must be made to function with life. In some way, we must change our attitude toward work and realize that dignity and self-respect are more closely related to honest labour than to the condition of want and rags of those who are unwilling to perform certain processes of work. If the village does not contain enough weavers to supply us with cloth to cover our bodies shall we remain naked rather than have our

children taught to weave, shall we remain dirty rather than practise proper methods of laundry work ? Among the practical tasks in textiles first to be taught should be that of weaving and the making of designs for Sari borders or mats for the floor, dying is a real art, and children might so easily learn how to practise it. In school such processes should motivate arithmetic and geography, and prove a real benefit to the commmunity. One has but to visit a village school to appreciate that there is not an adequate provision of appropriate clean clothing. Here is where the work of Household Arts must begin, though it end in the Historical, Scientific, Æsthetic and Economic study of costume in the College.

Lecture VI.

VI

" Eugenics " aims at the improvement of the race by means of breeding better people. " Euthenics " on the other hand, is a conscious effort to improve the existing race through control of present environment. The latter purpose is that of Household Arts. We may not have control over the conditions of our own birth, but we can control to a great extent the conditions under which we spend our life. Education is largely a matter of enlightening men's desires. We need to cultivate a just appreciation of health and material well-being.

To quote from Prof. Widgery: " The nineteenth century has tended more and more to the establishment of the position, that for a full human life, that is a life of physical health and of spiritual culture in the widest

sense, a certain level of material welfare and comfort is absolutely essential. To supply that for all is ultimately what is meant by the social problem." Household Arts is attempting to do its part in solving the social problem. A friend of mine, whose whole life is given to social service and whose interests are industrial rather than domestic, said to me recently quite seriously "Every investigation we make, every social condition we study, leads us back every time to the home. The social conditions of the working people cannot be solved until home conditions are improved"

The home is the heart of our social life and all too little has been done to study its organisation. "Home making" is a business conducted by parents, the product of which is the most precious of all products, children. Is the environment, the material equipment of our homes, what is needed to develop the best quality of children? Nearly all that we do is toward that end. The major part of our work is to secure the capital for running this business of "home-making." A good businessman usually needs a partner; one furnishes the capital, the other

the experience. So a man's wife is his working partner, and as they have a common interest, there should be a common pocket-book or bank account as well. Good partners who wish to succeed in their business, talk things over together and lay definite plans for the use of their capital. They make a budget of their necessary expenses. All self-governing bodies, companies or corporations, to-day start out with their purpose well-defined, the needs classified in the order of importance, a budget adopted with a percentage allowance set aside in due proportion to each need. Why should a household undertake to run its business from year to year without definitely determining the relative value and relative importance of its expenditures? "You cannot have everything" so there must be conscious choice made or the capital will be badly used.

Incomes vary in size, but it has been found, by study of many actual budgets that for all above a certain minimum the percentages of income spent for necessities are in ~~definite~~ proportion, no matter what the size of income may be.

The problems of life arise from our needs and the means of satisfying them. We have discussed some of these basic needs and to-day I intend speaking of our need for shelter. The study of the history of shelter is an interesting one and "Woman's Share In Primitive Culture" is written large in the history of the development of the house. We cannot take time to review this, for the present day problems are too pressing. Suffice it to say the house was evolved for the sake of shelter from cold and heat, from storm and wind, and as a protection against enemies both human and beast. It is intended to protect our home-life and afford a place for rest, refreshment and privacy. It is the place for the unconscious training of the young. The impress left upon the minds of children of their home environment influences their whole after life.

The maximum amount we may spend for shelter is fixed at twenty percent of the income, though sometimes when a saving in running expenses may be effected, twenty-five per-cent is permissible. We know this to be far above the possible percentage allowance for those who, because of insufficient income, must spend fifty or seventy-five percent of their wages for food.

How should the house be constructed to best suit our needs and conform simultaneously to the demands of convenience and beauty ? " All that can be seen from the house ", should normally be regarded as the " home ". The selection of the site upon which our house is built, should be made with a due consideration of its outlook. It is possible to conceal unpleasant sites, but difficult to create a beautiful view, and the presence of such from one's windows is very desirable. If we can, let us place our house, where good views are to be seen. The whole outlook of the day is changed by the scene persented one upon arising in the morning. A fine view from the dining room window is an excellent aid to digestion.

But we must also consider in choosing our site, the kind of soil upon which the house is to be placed. Is it loam, sand or clay ? The drainage of the site and dampness of the foundations are largely controlled by the character of the soil upon which the house is built. If the soil is clay, which holds moisture, special care should be taken to construct drainage pits and to introduce dampproof courses in the structure of the foundation walls. Of course the house

should be well raised from the ground, allowing circulation of air beneath. A layer of concrete over the ground surface not excavated or walled in, is considered a necessity of modern house-construction to prevent damp air from rising into the house.

The choice of building materials is a matter of economic limitations. That material which absorbs least moisture is of course the best. A well-baked pucca brick is almost as good as stone, but a kutcha brick absorbs much water.

The plan of the house is determined by the family life which it is to shelter, and should be adapted to the convenience, comfort, privacy and health of the family. As to the details of securing the first mentioned, we can make no mention to day. But the planning of the house, for the health of the family is of our present concern. How are we to guarantee good ventilation, sufficient light and comfortable temperature? Windows were originally intended for light and in modern houses, glass aids in carrying out this purpose. When the only light is secured through a door-way, or when windows are shuttered with wood, or when rooms are placed between

others with no direct outer openings, there is a deficiency of light detremental to health. Sunshine is the best known germicide and though there are seasons and hours when it is more comfortable to have a room darkened, it should always be possible to let the light and sun into each room.

But windows are also used, as a means of ventilation, where other openings are not provided. The temptation in India to close all windows tightly at night, from fear of the night-air or robbers, is doubtless accountable for the prevelence of disease scourges during the cold weather, such as the present pestilence of plague. Where such fear exists, other openings for the admission of air should be provided. These openings being arranged at different heights, one for the entrance of fresh air and the other for the exit of the foul air. Fear of the night-air probably arises from the old belief in the cause of Malaria, as that name indicates; but now that we know Malaria to be transmitted by the mosquito, our fear should be transferred to this unpleasant enemy.

It is surprising in a country where mosqui-

foes and other insects are so prevalent, to find the doors and windows unscreened. We screen our houses as a matter of course, though insects are comparatively few. The beneficial results in a lower death rate from diseases spread by mosquitoes and flies, compensates beyond all measure for the expense. A fine wire-screen over the windows, and extra screen doors that can be fastened from within, provides safety from all prowlers whether insect, animal or human. This meets the situation in the hot weather; but for the poor man who cannot afford more bedding to keep his family warm in cold weather and is therefore tempted to tightly close all windows, it would be wise to suggest covering the openings with thin cloth, such as a sheer quality of Malmal or Jagannathi. This permits the air to pass through, but keeps the room warmer than the wire screening.

When we are considering temperature, the ceiling should be mentioned, for the house without a ceiling is much hotter than one with a ceiling, which is well ventilated between roof and room. The roofs made of flat or Mangalore tiles are unquestionably better the curved country

-tiles. The country-tile is particularly bad as a place for harbouring rats and other vermin. If we are to give credence to architecture historians, it would seem a pity that the splendid ancient roof of Bengal should be no longer in use. It appears to have been much better for withstanding the heavy rains than modern roofs.

It is a surprise to find so few chimneys in use in this part of India. The chimney is such an excellent means of ventilation, and there are times when a little fire would be very comfortable for warmth or dryness. In the kitchen or room where the cooking is done, a chimney is necessary and doubtless much eye trouble which arises from the presence of smoke could be prevented if there were chimneys to carry off the smoke and gasses which can now only escape through windows, doors and cracks. As has been previously suggested, the products of combustion are bad and fire exhausts the supply of air which the family needs for breathing purposes.

With regard to the floors, stone or concrete are accepted as the best for India, largely on account of dampness and vermin. Where the

custom of sitting and sleeping upon the floor is so general, dryness in a floor is of paramount importance. Whatever the custom may be, one cannot get away from the fact that decayed organic matter, such as cow-dung, furnishes food for bacteria. A dry and sterile floor is a matter of first importance in house construction. Where houses are built several stories high, I find the communicating stairway usually placed in some dark, out of the way corner. They are steep, narrow and inconvenient.

Factors favourable to the growth of bacteria are darkness, warmth, moisture and food. To keep our house free from bacteria then, first let in the light, secondly provide means for proper ventilation, thirdly avoid materials which hold moisture, and build against dampness, fourthly keep every thing within and around the house and its compound thoroughly clean that no food for bacteria may be obtainable.

In order to accomplish this last task, it is of primary importance that waste material be removed in a systematic way, whether that waste be garbage, dust, trash, or excreta. Where ever these materials collect, bacteria and flies are bred,

The flies carry the bacteria back to the house, where they light upon the food and the people, thus spreading disease. The fly should be called not a house-fly, but a filth-fly and should never be permitted to enter the house, if we value our health.

Sanitation has been defined as a science, " which has for its object to make growth more perfect, decay less rapid, life more vigourous and death more remote. " We now know the causes of disease to be germs and the special bacillus or bacteria which causes each disease has been identified. We have passed beyond the stage of speculation. Let us remember that darkness and dirt breed disease and cause death. Where stairs are dark, they are not likely to be cleaned and cleanliness is the watchward of all good house-keeping.

The custom of using the ground-floor for storage is one of the means by which plague-rats are harboured. It is evident that in India the rat is a domesticated animal. Let us have no dark corners, unused rooms or store-houses that offer exactly the home which a rat prefers, and we will find our houses free from these pests.

We wish our houses built and kept to protect us from our enemies and we must realize that the worst enemies are not those who will steal our wealth but the enemies that will steal our health. Our house should be built vermin and insect proof and they should be kept bacteria proof.

We know how disease is contracted and spread. Germs may be introduced into the body, either by contagion, inhalation or inoculation or by ingestion. For the first, direct contact with the diseased person is necessary, for the second the germ is transmitted by the breath. The third method is by biting insects, such as mosquitoes, midges, fleas etc, and the last is through contamination of food and water by flies, dust, discharges from the sick, dirty hands etc. Whereever the opportunity exists for these germs to be introduced into our bodies, we run the danger of contracting disease. Some people possess so much vitality that the body has power to destory the germ. These people are able to pass safely through dangerous condition unscathed. It is those, with lowered vitality and deteriorated health, who easily "catch" disease. From this one should judge of the importance of

building up and maintaining a strong constitution. The right kind of a house and the proper kind of house-keeping are large factors in securing this end for the rising generation.

We might hastily review the diseases prevalent in India that could be reduced, yes even prevented by sanitary housing and scientific house-keeping. The disease which is most in our thoughts at the present time is plague and I quote from the Bombay Medical Congress the statement there made concerning this disease.

" First—Bubonic plague in man is *entirely* dependent upon the disease in the *rat.*

Second—Infection is conveyed from rat to rat and from rat to man *solely by the rat-flea.*

Third—A case of Bubonic Plague in man is not in itself infectious.

Fourth—Insanitary conditions favour infection by rats and so contribute to occurance of plague.

Fifth—Plague is usually imported from place to place by rat-fleas, which are carried by people on their person or baggage.

The human agent himself frequently escapes infection. ".

Knowing this it does seem that we should conduct a compaign to open up all dark places where rats might nest or hide, to the light and exterminate the rats. Then, with the sunshine to destroy any remaining germs, we might look forward hopefully to next year, with little fear of a recurrence of the plague. Unless we do this, Baroda may expect worst conditions next year than this.

If we would protect ourselves from the Cholera, these eight factors must be secured. Pure water, clean food, efficient conservancy and disinfection of clothing or anything that has had contact with the sick, the banishment of flies, clean houses and clean surroundings.

If we would conquer Enteric or Typohid fever, we must remember that this microbe is conveyed by means of water or food, especially milk, which has been contaminated by the excreta or saliva of typhoid patients; by dust; by infected clothing, by people who are human carriers of the disease. Flies are one of the

most common means for distributing these germs. When one reads that India in one year lost four lacs people by small-pox and when it is realized that this disease can be prevented by the simple expedient of vaccination, we can only wonder, why this means of prevention is not made compulsory in all India, as it is in Baroda.

Tuberculosis has been called the bed-room disease, because of the intimate connection between the over-crowding and ill-ventilated bed-rooms, and the conveyance of the tuberculosis basillus from one to another, where fresh air is insufficient and proper disposal of the sputum is not practised. Indiscriminate expectoration is largely accountable for the spread of this disease. One person in five is said to be tubercular. The common practice of hacking, coughing and spitting spreads the germs by throwing them into the air from diseased lungs, where innocent passersby breathe them into their own healthy lungs. Flies also spread the germs and this makes another reason for the banishment of all waste material which breeds flies, and the protection of the house from the entrance of flies. This disease is common among cattle

as well as men and it may be contracted through drinking milk of tubercular cows. The pasturation or boiling of milk is therefore important, where ever dairy conditions are not absolutely under State control and the milk certificated. A state of lowered vitality is particularly favourable to the contracting of tuberculosis and while it is impossible to inherit the disease, one may inherit a weak constitution that makes them easily susceptible to the disease.

By far the largest proportion of people in India die from fever. The statistics show an appalling figure. As has before been mentioned, Malaria (" Bad Air ") was supposed to result from "Miasma". We now know that the mosquito is the carrier of the disease germs. Now that we recognize our enemy, why should we not lay an attack upon mosquitoes in all stages of their development ? You know it was stated that America would never be able to construct the Panama Canal, because the workmen would not be able to withstand Malaria, which infested that whole region. By the application of scientific knowledge in draining the swamps, pouring oil upon all other water surfaces where mosquitoes might breed, cleaning up the edges of ponds,

tanks and lakes, we destroyed the allies of the mosquitoes and also the mosquitoes themselves, in all stages of their development. All houses were thoroughly screened against them, and the parasite of Malaria, whenever it had gained its entrance into the blood, was attacked by the administration of quinine. These are the simple means by which Malaria may be prevented and destroyed anywhere as successfully as it was accomplished in Panama.

The Sand-fly fever can best be prevented through good housing. Good walls and good floors (with all old ones removed and all old wood-work either torn out or repainted and varnished, with the walls painted and the floors free from matting) are necessary if this disease is to be avoided.

I believe it has been proved that sanitary housing is a prime essential of healthful living. Attempts at housing reform are always met by economic objections, but how shortsighted are the arguments used. Do we value life less than property? Should the objection of owners be permitted to control a policy concerned with the health and lives of the people? When we see the excellent

craftsmanship taught in Orphanages and in Jails, one must wonder why this best type of training is reserved for the dependents of the State. Would it not be wiser to make the children in our schools economically independent and prevent their becoming wards of the Government ? The proper kind of Industrial Arts Education does not rest satisfied with "Manual-Training". That term is now taboo in Educational circles. We expect the boys to know how to build real houses, to make real furniture, to do real plumbing or machine-work; just as Household Arts scorns a "model" in sewing, but teaches the girls to make real clothes, and house furnishings. Let our boys be taught how to make a house that is strong, sanitary, and beautiful equipped with labour-saving devices: then let our girls furnish and decorate it. This can become a practice house that will be a model to the community.

They might make such things as this "fireless-cooker" which I have constructed to show you. Time and fuel are both valuable, this will save both. But life is most valuable and is being ruthlessly wasted. Household Arts must make its rudimentary beginnings in the problems of the simple, crude, mud or grass house of the

village. It will set its higher ideals of housing through a study of the History, Indian Architecture, and of Sanitary Science in the College classes. It must attack the social aspects of this subject and note the kinship between health, houses and incomes. There is no limit to the need for study of methods of house-management and child-care.

The condition in Europe, where the lives of our soldiers are being destroyed at the rate of nine per hour, fills us all with the deepest sense of sorrow. We each would like to do something to aid the cause of liberty and save this waste of life. Do you realize that twelve babies die hourly at home in England and that the lives of at least half (50,000 babies a year) could be saved ? Somewhere a baby dies every five minutes. A large percentage of these disasters is the result of improper feeding, unsuitable home conditions, bad housing, and ignorance. If we cannot fight for our country, let us fight to conserve the lives of the children.